Intelligent Transport Systems (ITS)

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Urban Transportation Planning

MIT Course 1.252j/11.380j

Fall 2002

Mikel Murga, MIT Research Associate

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Scope

- TeleComs
- ITS:
  - Automobile Oriented
  - Transit Oriented
  - Integration
- From deployment of new technologies towards organizational changes

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Information and Communication sectors

- Fastest growing sectors in Europe
- 5% GDP: 4 million employed
- 300,000 new jobs (‘95 - ‘97)
- More to come:
  - audio visual
  - mobile services

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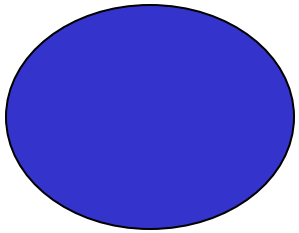
Cell phones new markets

Info Services

Messaging



m-commerce

Positioning

Entertainment

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Mobile Positioning System

- **Positioning methods:**
  - Cell Identity (150 m-40 km)
  - Network Based AGPS (10-20 m)
- **2G & 3G networks**

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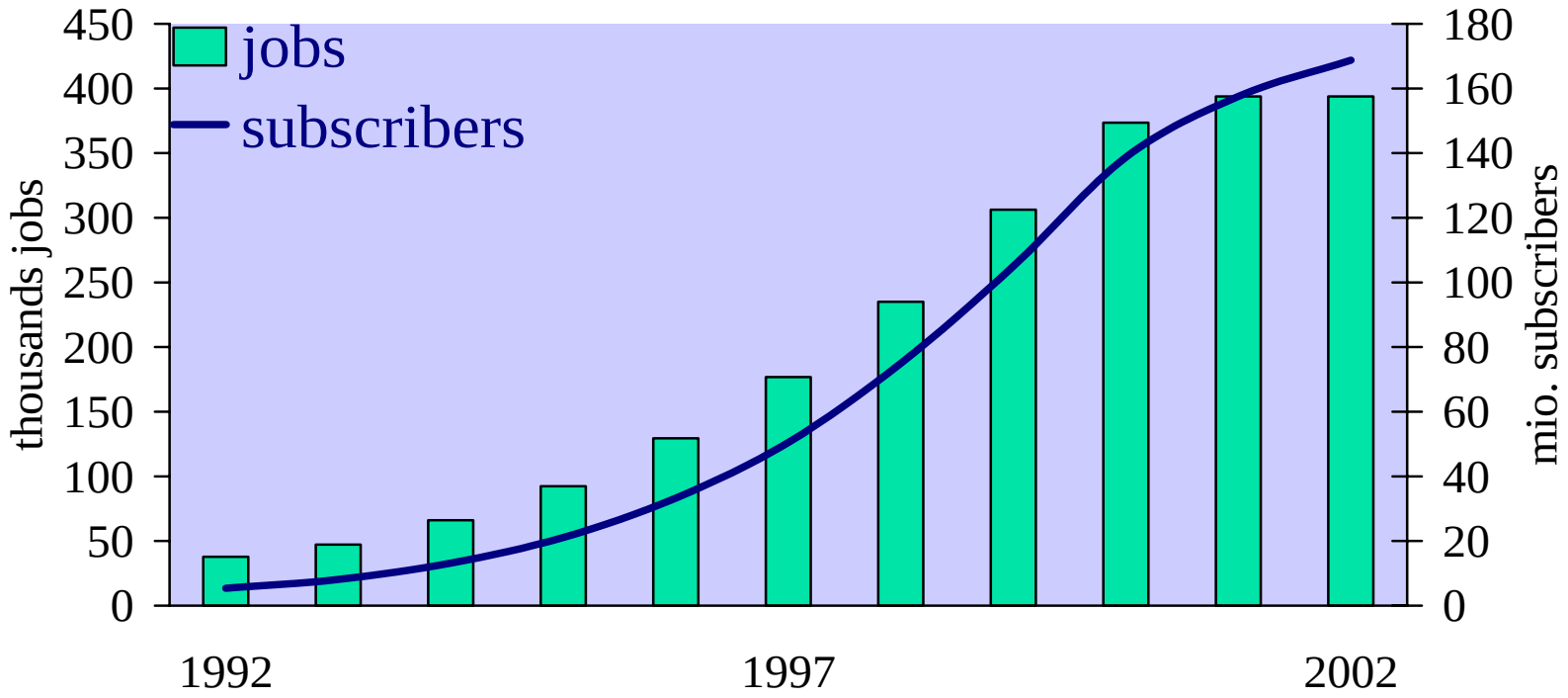
Telecoms jobs are booming



Mobile Telephony

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Forecast increase in Internet Users

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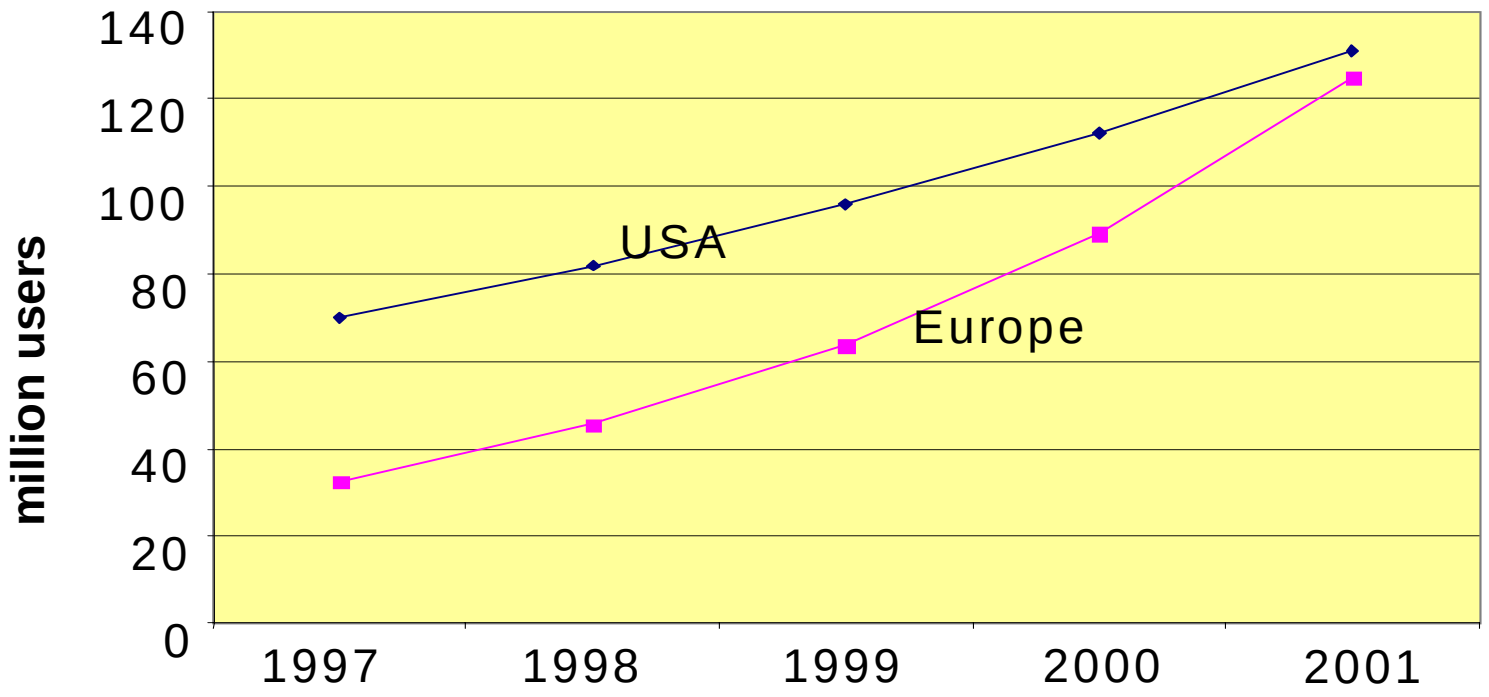

Source: Commission estimates based on various Industry

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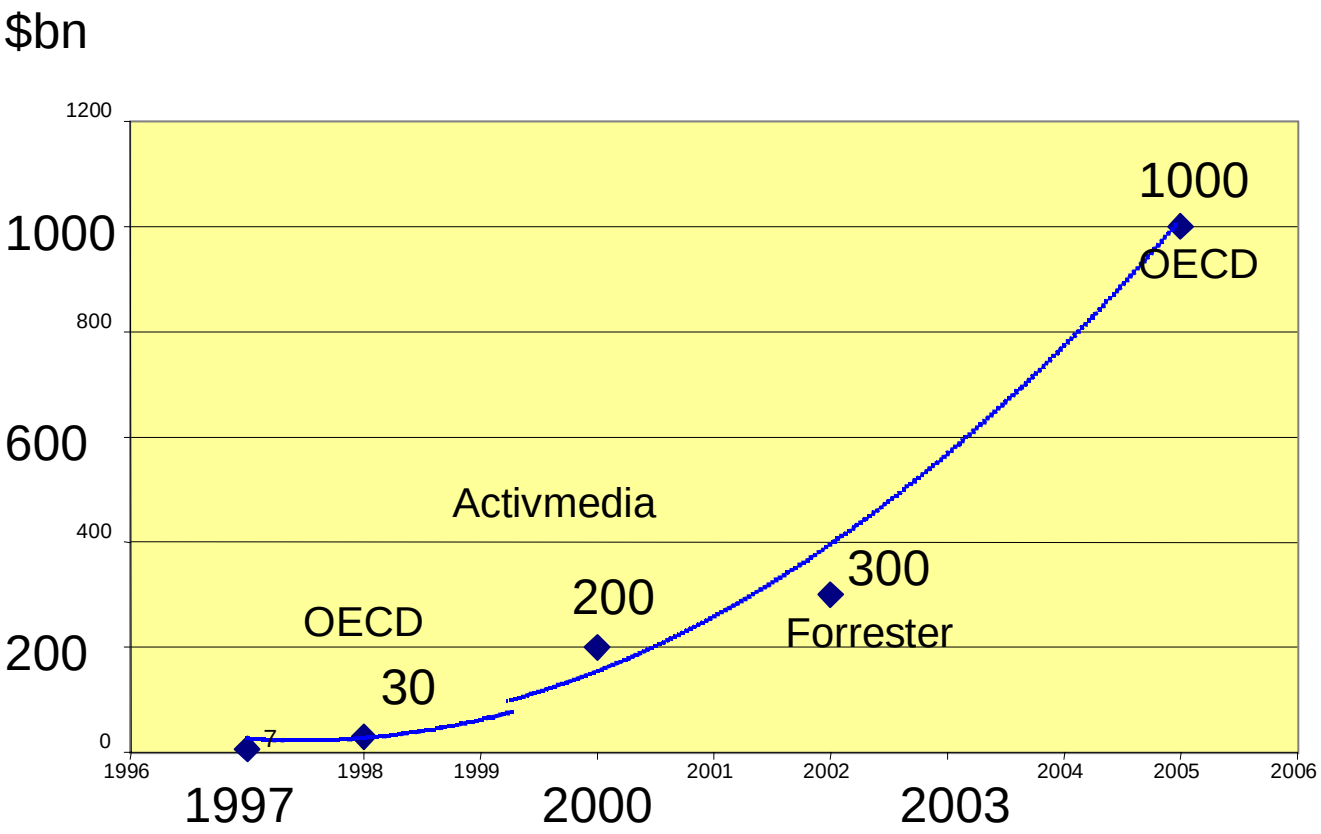
Projected E-commerce growth



Sources: various forcasts as indicated

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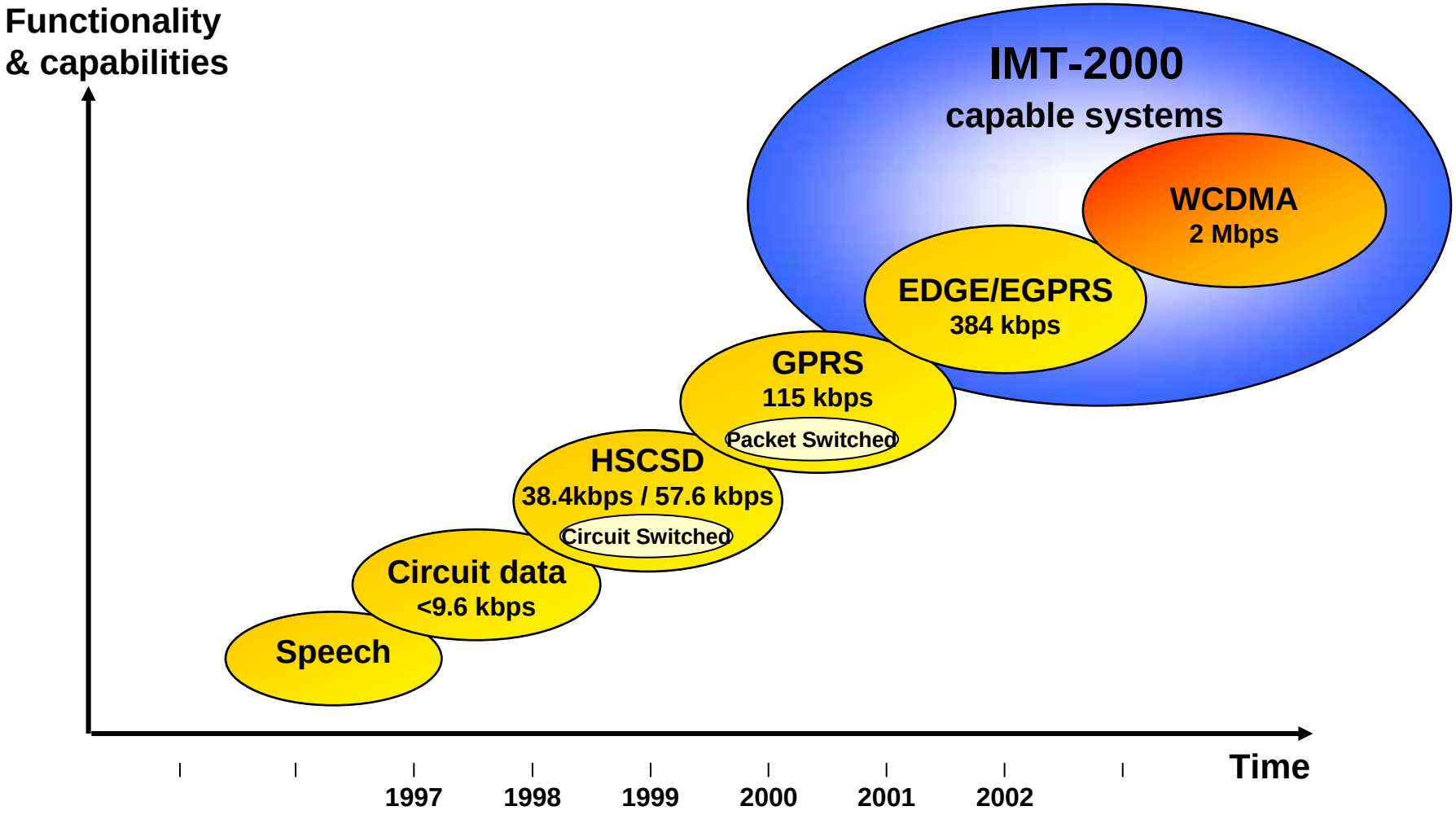
Technology evolution



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Technology evolution

- SMS
- SIM Toolkit
- WAP
- GPRS
- Bluetooth
- Terminals
- Smartcards
- E-commerce
- Security
- Positioning

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Business (r)evolution

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- Portals -
  Internet ”market places” or ”malls”

- Consumer behavior
  - **comfortable with on-line shopping**
  - **SMS**
  - **internet banking**
  - **internet stock trading**
  - **mobile devices are personal**

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The challenges of telecom providers...

- Mobility -
  taking services from the desktop to the pocket for the ultimate in convenience
- Security, payment, browsing and devices are key technology

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The new European environment

- 100 million users of GSM services
- 450 channels of Digital TV / interactive services
- 30 million INTERNET users
- 4 million teleworkers
- ... And an ageing workforce

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What sort of Information Society?

- Employment rich
- Socially inclusive
- Economically stable
- Culturally diverse
- Environmentally sustainable

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New ways to work in all sectors

- Flexibility in time and place
- Better use of skills
- Reduced investment for new job creation
- Reduced overhead costs
- Financial viability for more new kinds of work
- Greater responsiveness

Work is "what you do", NOT "where you go to"

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Teamwork and telework:

- Teamwork across borders and timezones
- Real-time and asynchronous
- Linking different types of workplaces
- Intra-company and inter-company
- New tools and standards

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Let's talk about videoconferencing...

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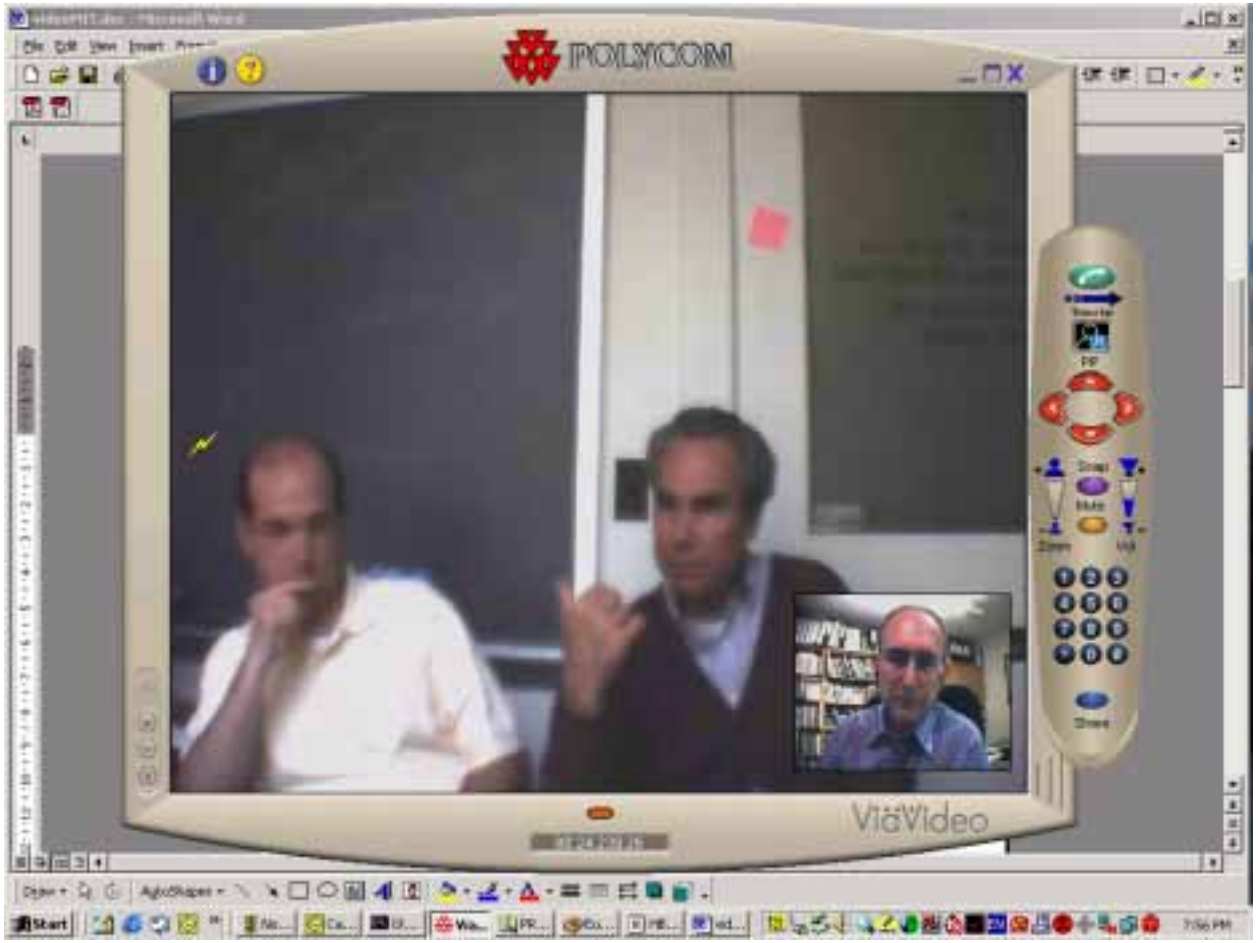

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Secure electronic financial transactions:

- Business-to-business, retail and administrative transactions
- Billing, payment, accounting
- Anonymous small payments
- Reliable, tamper-proof smart cards and personal tokens

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Europe Today

- Leads in:
  - Mobile communications
  - Digital television
  - Digital local access
  - Electronic payments and smart cards
- Lags in:
  - Corporate IT investment
  - Use of the Internet
  - Electronic commerce
  - PC industrial and technology development

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Is Transport any different??

ITS: Control, management and information tools aimed to improve the efficiency, safety and quality of service of the transportation system

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Intelligent Transport Systems (ITS)

Sectors involved:

- Transport
- Automobile industry
- Telecoms
- Banking
- Consumer electronics
- Tourism
- Mass Media

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Intelligent Transport Systems (ITS)

Urban Traffic:

- Traffic Signals
- Monitoring throughput:
  - Recommended speeds
  - Ramp metering
- Incident Management
- Signal priority for:
  - Emergency vehicles
  - Public transport

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Intelligent Transport Systems (ITS)

Real-time Information:

- Automobile traffic
- Public transport
- Parking
- Airport arrivals/departures
- Points of interest (POI)
- News, banking, stocks...

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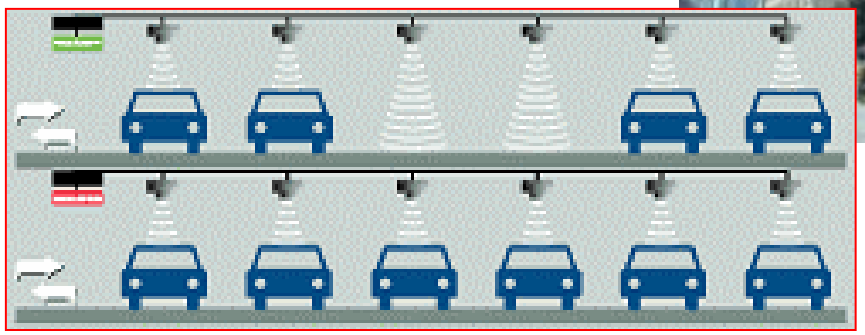
Parking

- Information on availability
- Guidance to:
  - Available facility
  - Actual spot



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Intelligent Transport Systems (ITS)

Payment sytems:

- Tolls
- Transit fares
- Parking
- Electronic purse
- Mobile-business

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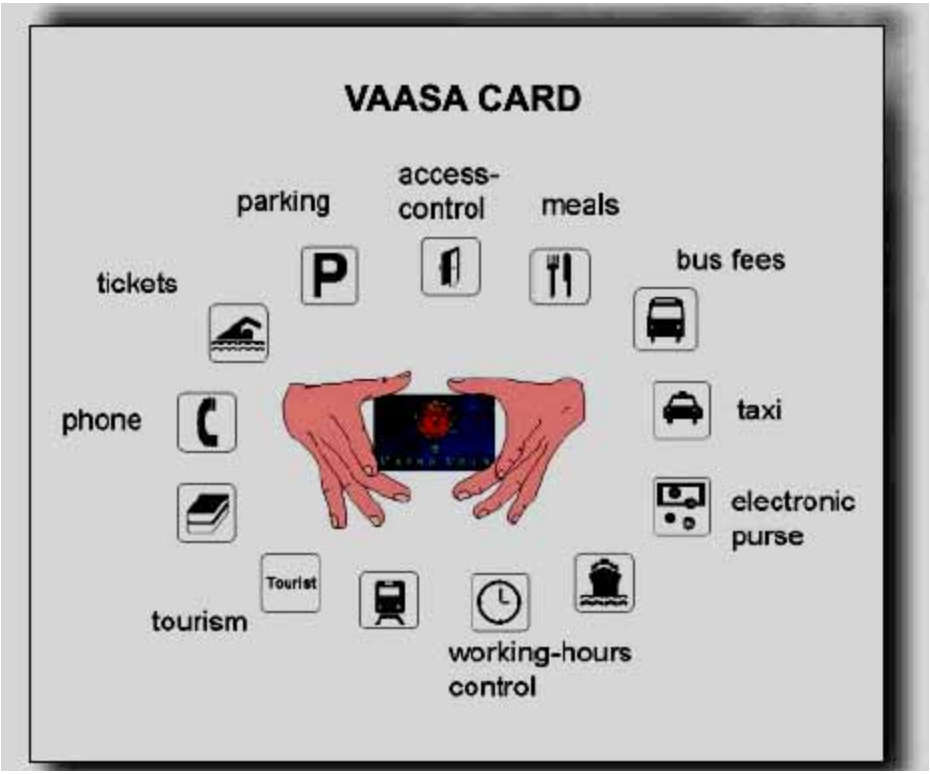
Payment systems



Courtesy of ERTICO

Towards a consolidated system

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Intelligent Transport Systems (ITS)

Urban Goods distribution:

- Fleet Management
- Real-time location
- Load consolidation
- Hazmat management

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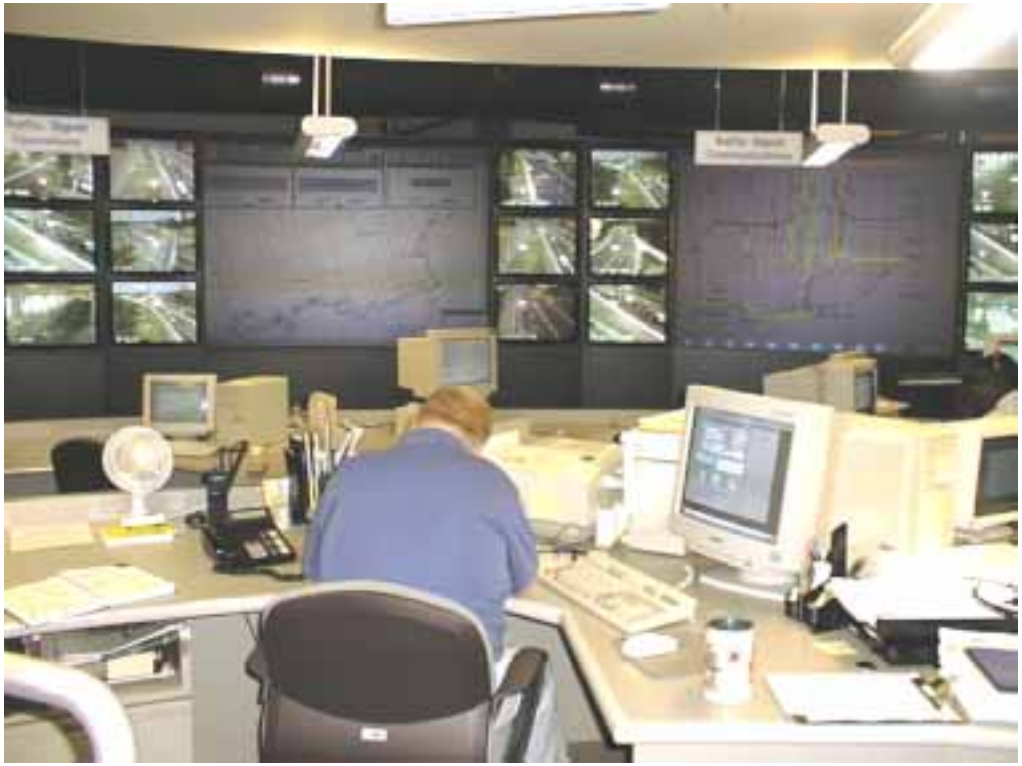
From Traffic Control Centers (TCC) to Traffic Management Centers (TMC)



Just a name change?

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Traffic and Traveler Information Services

Conditions relayed via web sites and cell phones.

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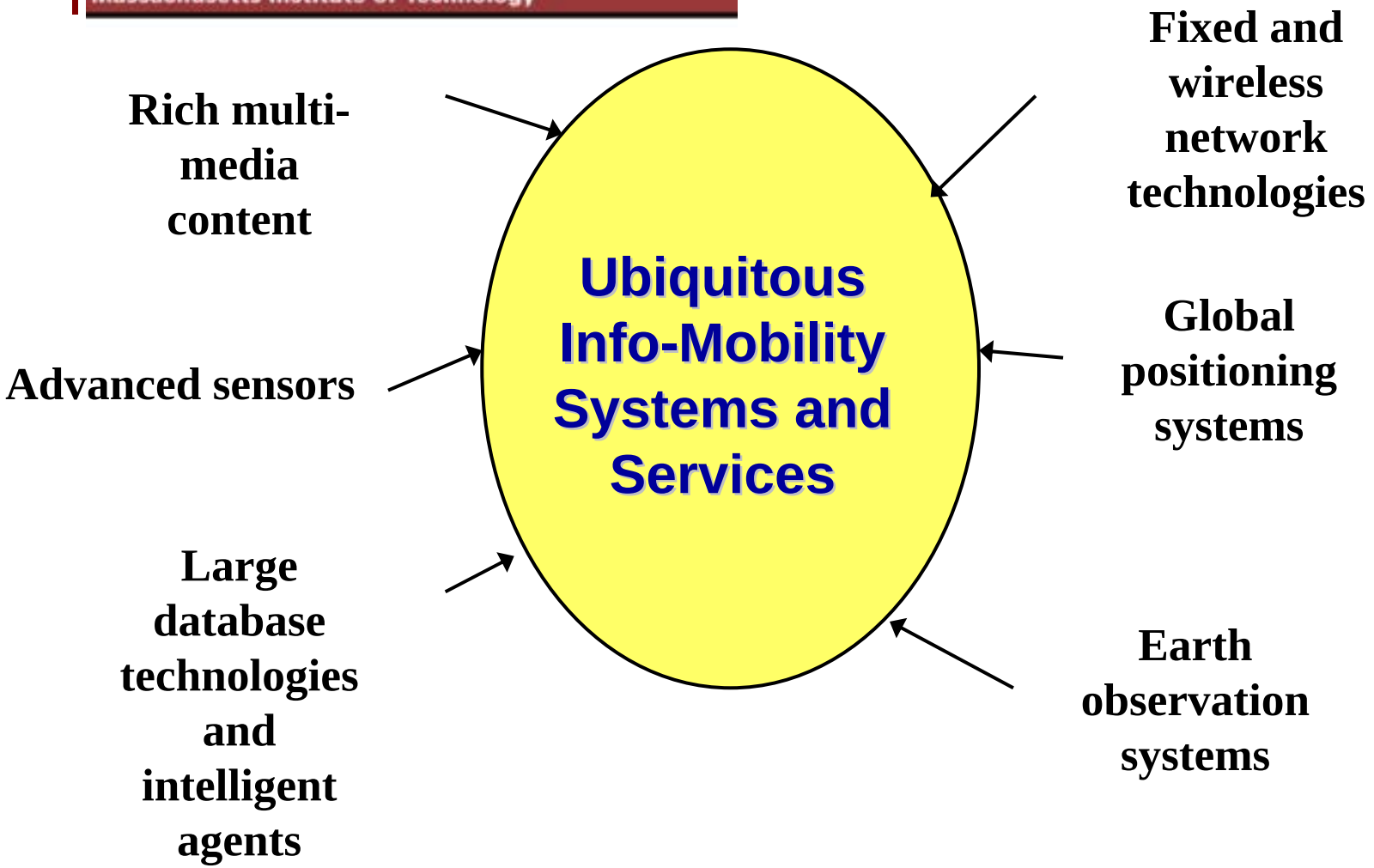
Part of Info-Mobility



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Seattle...

- Real time information on the Web
- Updated every minute
- From color coded maps to actual photographs of the traffic stream
- You can check in real time an incident
- Even choosing to see upstream impact

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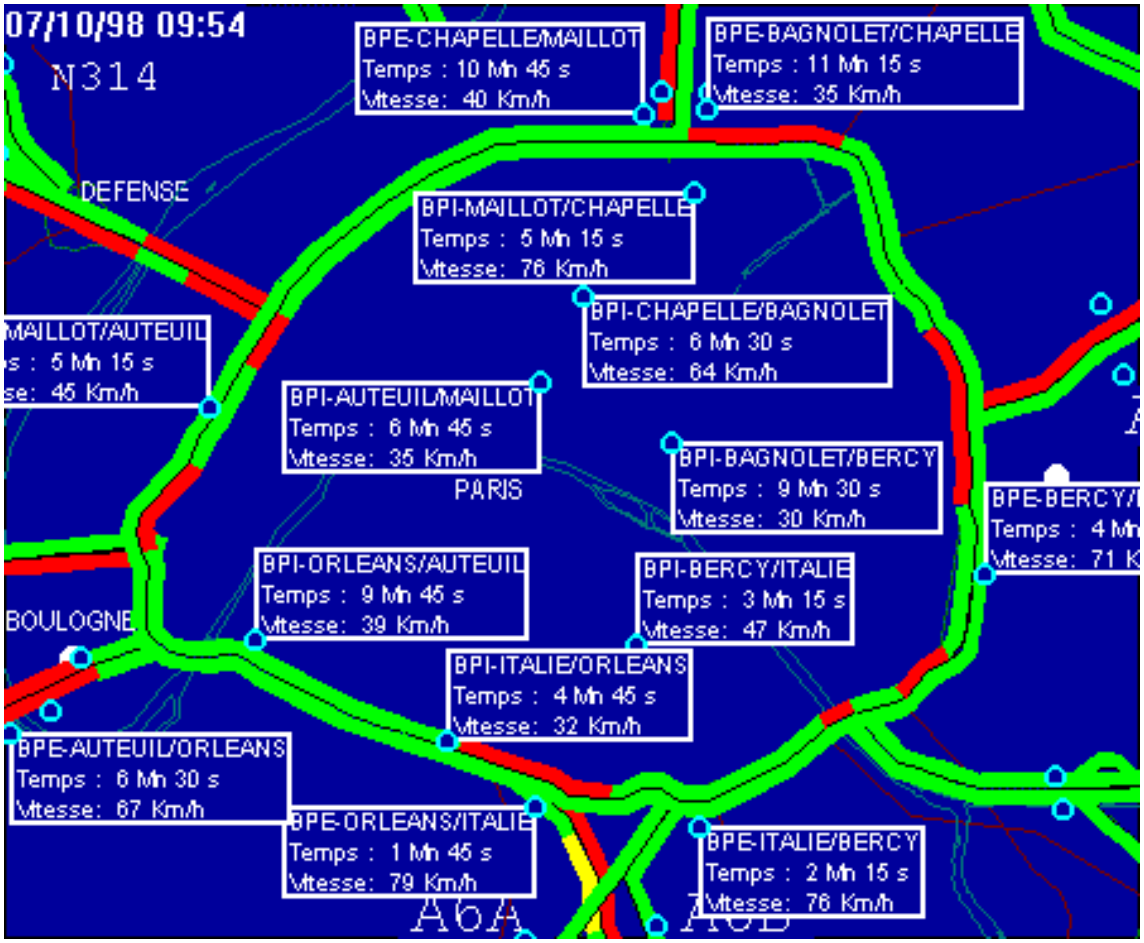
Paris....

Color coded maps, time estimates ... and times by transit



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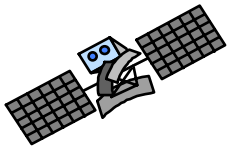
One of the car dreams...

RTI center



pre-trip:
- trip request at departure
- trip recommendation

on-trip:
- deviations from indicated travel times
- new travel times and routes

location

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New high-end services to maintain client loyalty...

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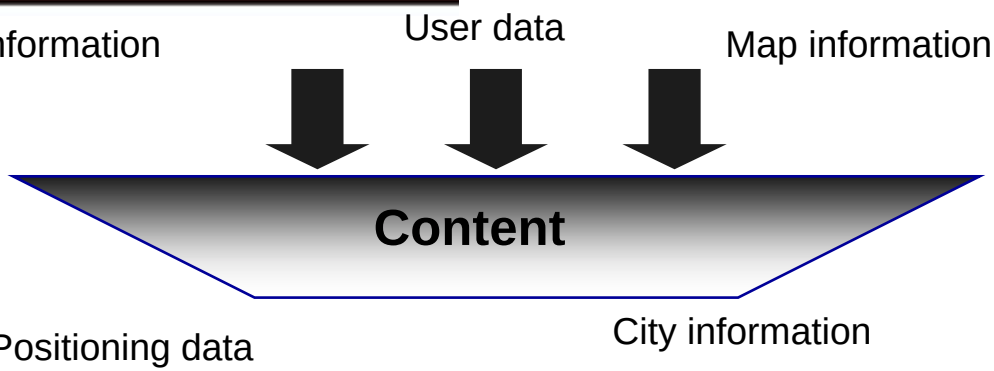


Close

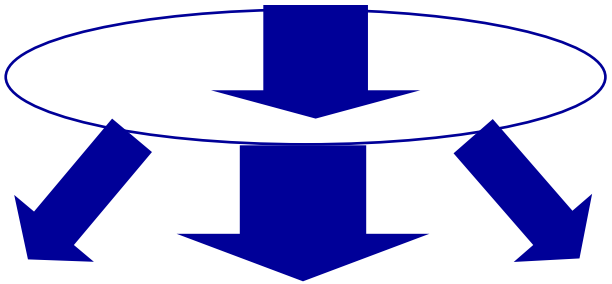
„The next pharmacy ...“

City-Navigation

„The fastest Route ...“

My profile

„Do not forget the birthday of your mother-in-law ...“



refined Content

My Program

„My nicest day ...“

Watchdog

„My flight is delayed ...!“

City Highlights

„Which club is still open...!“

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Public Transport

- Real-time information for:
  - Operators:
    - Fleet management
    - Travel time reliability
  - Users:
    - Waiting anxiety

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Public Transport

Easy to deploy within each turf, but

hard to integrate across operators and modes

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ITS as a Tool - Main Objectives?

- To increase road capacity at low cost?
- Or, just an opportunity to promote a more efficient and diversified transport system?
- Should it be used to enhance mobility -- Or to improve accessibility? Or perhaps, just to substitute some trips on certain days?

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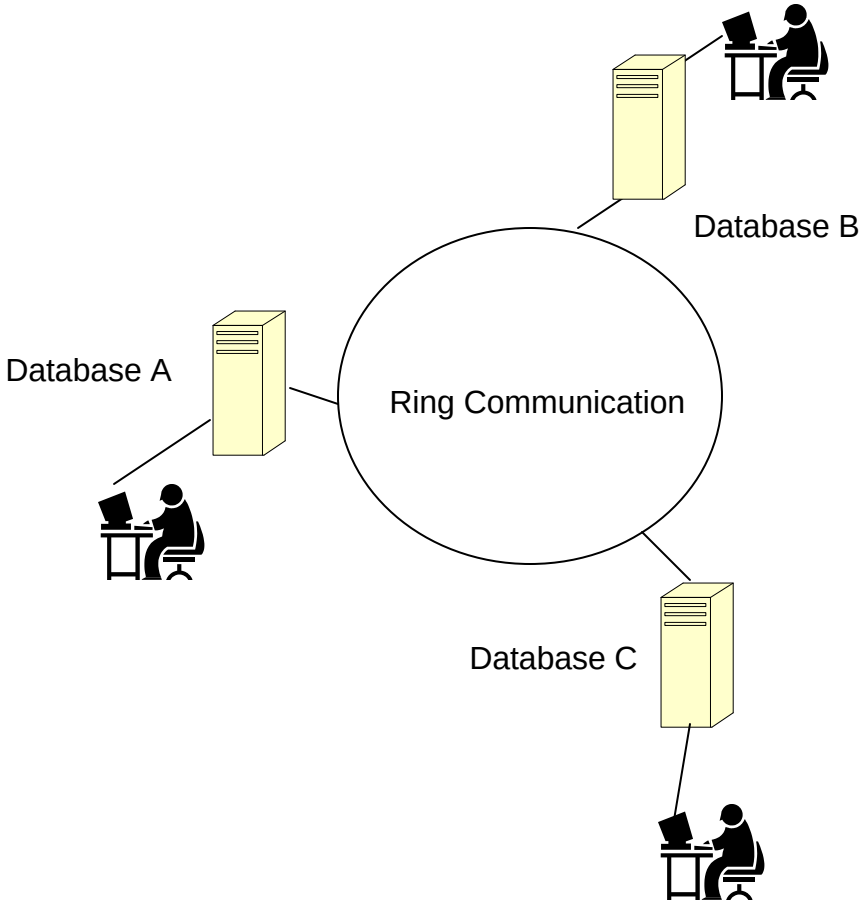
ITS Deployment

- ITS Deployment requires:
  - Important organizational changes
  - A new path from control to sharing information
  - A transition from hierarchical systems to networks



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ITS Integration: A bumpy road

- **ITS:**

  Information +

  Communication +

  Integration

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ITS Integration: A bumpy road

- *Let's share information*:
  - The public needs a single source of multi-modal information
  - The operators can benefit by sharing real time info
- *Let's decide with others in mind:*
  - Impacts or synergies on third parties?
  - Modularity of equipment and architecture?

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ITS Integration: A bumpy road

ITS is not a technical issue but a new frame for:

- Voluntary cooperation
- Seeing the big picture
- Bringing others into the decision process
- Adopting necessary new policies

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ITS Deployment

In short, ITS other than short-term mitigation tools, may serve :

- ✓ To become catalysts for change
- ✓ To establish new two-way relationships
- ✓ To create new spaces for collaboration
- ✓ To provide a global vision of the transport system

... But, ITS involves a long complex and difficult path, which has to be taken

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eEurope Main Targets

- Key challenge is to meet the growing demand for mobility within the finite transport networks
- Congestion in road transport
  - Speed up the development and deployment of Intelligent Transport Systems
- Safety of road, rail, air and maritime transport
  - Active safety systems in vehicles
  - Enhanced 112 with location information (equiv to US 911)

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eEurope Targets: ITS Deployment

- Speed up the Development and Deployment of Intelligent Transport Systems
- To support the development and deployment of value-added traffic and travel information services to cover 50% of major European cities (2002)
- All main trans-European networks should be covered by traffic incident/congestion information and management systems (2002)

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eEurope Targets: ITS Deployment

- Timely and reliable information and guidance services (in real time, pre-trip/on trip)
- Effective congestion and demand management strategies (to improve delays and to contribute to the environment, safety and intermodality)
- Efficient incident and emergency management (detection, verification, response)

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eEurope Targets: Safety

- Safety of road:
  - New emphasis on account of 42,000 yearly deaths
  - All new cars sold in Europe equipped with more efficient active safety enhancing systems
- All citizens on the move throughout Europe should have access to:
  - call localization and
  - emergency services through the 112 number
    - CGALIES Coordination Group www.telematica.de/cgalies

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eTransport

Benchmarking

- Part of eEurope Benchmarking exercise
- europa.eu.int/information_society/eeurope/
- benchmarking/index_en.htm
- Objectives:
  - Enable Member States to compare their performance;
  - Identify best practice;
  - Enable remedial action to be taken.
- Quantitative and qualitative benchmarks (e.g. policies behind best practice)

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eEurope ITS Benchmarking

- Traffic and Travel Information services in cities;
  - Availability of services
  - Use of services
  - Impact of the services
- Motorway incident detection and management systems;
- Active safety systems in vehicles;
- Location determination of wireless callers through 112 number

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Final thought

- What do you think...
  - Is ITS good or bad?
  - Does it help to bring down some barriers?
  - Is technology in general or bad?
- The trouble is that we have to master the technology
  - ... And to top it off, it requires wisdom
  - See the article of the Sept issue of the Atlantic Monthly on Home Security